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ABSTRACT

This project report describes major features of the 2-year Student-Teacher Ratio Project, including objectives, personnel, activities, findings, and resulting products. The project's purpose was to conduct an analysis of the efficacy of current practices in student-teacher ratios for providing special education services to mildly handicapped students. Results of current research on student-teacher ratios within regular education remain inconclusive. The first of four studies revealed great variability in current special education student-teacher ratios, which were examined through an analysis of state guidelines and a national survey. In a second study, observations of 139 mildly handicapped elementary students under different student-teacher ratios (1:1, 3:1, 6:1, 9:1, 12:1) revealed differences in the qualitative nature of instruction and student academic response time, but no significant differences for task completion and task success. Next, a case study analysis revealed that the special education categorical label assigned to the student was unrelated to the effectiveness of different student-teacher ratios. A fourth study examined opinions about optimal student-teacher ratios for both student learning and teacher instruction. Results indicated that parents and teachers tended to prefer smaller group sizes, while administrators preferred larger group sizes. Project products, references, and a list of related research reports are appended. (JW)

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MONOGRAPH NO. 9

FINAL PROJECT REPORT

STUDENT-TEACHER RATIOS AND THEIR RELATIONSHIP TO INSTRUCTION AND ACHIEVEMENT FOR MILDLY HANDICAPPED STUDENTS

(Grant No. G008630121)

James E. Ysseldyke, Principal Investigator

INSTRUCTIONAL ALTERNATIVES PROJECT

August, 1988

EC 212783

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FINAL REPORT

Grant No. G008630121

STUDENT-TEACHER RATIOS AND THEIR RELATIONSHIP TO INSTRUCTION AND ACHIEVEMENT FOR MILDLY HANDICAPPED STUDENTS

Department of Educational Psychology

University of Minnesota

James Ysseldyke

Principal Investigator

August, 1988

Abstract

From June, 1986, through May, 1988, the Office of Special Education and Renabilitative Services, U.S. Department of Education, funded a grant project entitled, "Student-Teacher Ratios and Their Relationship to Instruction and Achievement for Mildly Handicapped Students." This project had four primary components: (1) survey current trends in special education student-teacher ratios within the United States; (2) examine achievement and instruction (quantity and quality) for mildly hanidcapped elementary students under different student-teacher ratios; (3) examine factors related to effective student-teacher ratios; and (4) assess social validity of different student-teacher ratios. Extensive data collection and analysis activities were completed as part of the Student-Teacher Ratio project. This report provides tne following information about the project: (a) objectives, (b) personnel, (c) major activities and findings, and (d) products from project activities.

This project was supported by Grant No. G008630121 from the U.S. Department of Education, Office of Special Education and Rehabilitative Services (OSERS). Points of view or opinions do not necessarily represent official position of OSERS.

Introduction

The Student-Teacher Ratio Project was funded in 1986 to conduct an analysis of the efficacy of current practices in student-teacher ratios for providing special education services to mildly handicapped students. This purpose reflected the growing concern in special education about increasing numbers of students receiving special education services. Special education administrators have been faced with the difficult task of making decisions without an adequate data base about how to appropriately serve students in cost effective ways. Especially of interest to administrators is the extent to which instructional effectiveness, academic time, achievement, and attitudes differ as a function of varying student-teacher ratios used with mildly handicapped students. Too often, administrators have attempted to restructure student-teacher ratios without information on the effects of increasing ratios.

In contrast, considerable research on student-teacher ratios has been conducted within regular education. Research on the effects of class size began in the early 1950s, reached an apex in 1978-79 with Glass and Smith's meta-analysis and reactions to it (cf. Educational Research Service, 1978), and has continued to be a topic of interest and controversy in several reviews (cf. Albritton, 1984; Glass, Cahen, Smith, & Filby, 1982; South Carolina State Department of Education, 1980) and articles (cf. Cacha, 1982; Cahen & Filby, 1979; Filby, Cahen, McCutcheon, & Kyle, 1980). The debate on the effects of class size on student achievement continues. Despite the current data base, there is no consensus on how class size influences student achievement, instructional techniques used in the classroom, student behaviors, and attitudes about instruction. Results are still considered to be inconclusive; some studies indicate small classes are better, others indicate large classes are better, and some do not support either as better.

Several possible explanations for the inconclusive results are described in the literature (cf. Albritton, 1984; Cacha, 1982; Cahen & Filby, 1979; Educational Research Service, 1978; South Carolina State Department of Education, 1980). First, class size has been defined or operationalized in different ways in different studies (e.g., student-teacher ratios, student-staff ratios, class averages, teacher contact hours, teacher load). In addition, large and small classes are not defined in a consistent way across studies. Second, methodological weaknesses such as lack of random assignment, lack of control over teacher variables, or lack of control over socioeconomic conditions in different school districts, have been noted.

Another explanation for inconclusive results is the lack of longitudinal studies. Typically, student achievement gains have been measured over a relatively short period of time (i.e., less than 6 months). It is argued that improved learning requires changes in instructional methods and teacher behavior that take time to influence a student's progress. A fourth explanation suggests tnat different results have been obtained in studies because they have used different outcome measures. Studies revealing no class size effect on achievement are based on standardized achievement measures, whereas those studies that find class size effects significant also include measures of affective areas, including mental health, problem solving, personal satisfaction, and creative development.

Yet, another explanation for inconclusive results is that quality of instruction has seldom been examined as a critical intervening variable in the class size-achievement relationship. If a teacher teaches in the same way for similar amounts of time in both smaller and larger classes, differences in pupil

outcomes would not be expected. While smaller classes are consistently viewed as having the advantage of providing increased opportunity for teacher contact time and individualization, some studies have found that teachers do not individualize or alter instruction when student-teacher ratios are reduced. Poor teaching is not effective even in a small classroom. Finally, assumptions are made that may contribute to the belief "smaller is better." For example, some studies show specific teaching practices and procedures (e.g., more individualization, interpersonal contact) occur more frequently in smaller classes. They assume that these practices are superior, without documenting related student achievement gains.

Two major studies reached the conclusion that smaller class size results in teachers implementing instructional approaches in a more effective way, but does not alter the teachers existing styles or plans. The Class Size and Instruction Project (Filby et al., 1980), conducted at Far West Laboratory, documented and described differences in instruction and teacher and student behavior when class size was reduced by one-third midway through the school year in four grade 2 regular education classrooms. In smaller classes: (1) Each student received more individual teacher attention; the teacher provided assistance and feedback more promptly; (2) Student attention increased; students paid attention to the academic task an average of 72% of the time during reading and math compared to an average of 56% of the time in larger classes; (3) Curriculum changes included more enrichment activities; and (4) Discipline problems decreased and classes functioned more smoothly. However, general instructional approaches or methods, textbooks, and discipline methods were similar regardless of class size. A two year study conducted in Toronto (Wright, Shapson, Eason, & Fitzgerald, 1977)

investigated the differences between four class sizes (16, 23, 30, 37 students) for students in grades 4 and 5. The researchers found that varying class size resulted in few changes in classroom functioning, even though it was perceived as beneficial by teachers and parents. Any instructional changes that occurred seemed to be due to fewer students not to differences in teaching. Still, evidence suggests that student-teacher contact time does affect student achievement (Klein, 1985).

In pursuit of an understanding of the class size and achievement controversy, Glass and Smith (1978) conducted two meta-analyses. According to Cacna (1982), the results from the first Glass and Smith meta-analysis of class size and achievement led to three conclusions: average student achievement increases as class size decreases; average achievement of students in groups of 15 and fewer is several percentile ranks above that of students in classes of 25 and 30; and achievement appears to increase dramatically only when class size is below 25. The findings of their second meta-analysis cited by Filby et al. (1980) indicated that smaller classes were associated with greater individualization, student participation, and quality of instruction. Both teacher and student attitudes were more positive in class sizes below 20.

In their critique of the conclusions of the meta-analyses, the Educational Research Service (1978) questioned the validity of the methods used and the subsequent generalizations. After reviewing 54 class size studies conducted between 1954 and 1977, they tentatively concluded that:

- Class size is a major determinant of school system budgets.
- Opinion polls have consistently indicated teachers believe a class size of 20-24 students results in higher teacher morale, satisfaction, effective teaching, and increased academic, personal, and social development of students.

- The public (e.g., parents) favors smaller classes.
- There is some evidence for a positive relationship between small class size and student achievement when primary grade students are taught in small classes for two or more consecutive years.
- There are no clear cut guidelines for an "optimum" class size for all types of students at all grade levels.
- Small classes are no guarantee or panacea for desired affective or academic outcomes.
- There is some evidence that small classes are important to increase student achievement in reading and matnematics in the primary grades, for students with lower academic ability, and for economically or socially disadvantaged students.

These results hint at relevance to special education but do not directly address it. Most studies that have looked at class size in special education have focused primarily on the severely handicapped population, where one-to-one instruction is preferred (cf. Alberto, Jobes, Sizemore, & Doran, 1980; Baker, 1980). For example, in a recent observational study, Snart and Hillyard (1985) compared the amount of instruction time available in classrooms for severely/multiply handicapped children ranging in ages from 6 to 16 years when student-staff ratios varied from 10:3 to 5:3. They found increases in instructional programming time with corresponding less time spent in noninstructional activities (e.g., caretaking) occurring with a 2:1 student-teacher ratio.

Two other studies suggest that individualized instruction is not always superior for the severely handicapped. Alberto and his colleagues (1980) found group instruction to be as effective as one-to-one instruction in the acquisition of certain behaviors. They examined how the acquisition of three tasks (understanding of prepositions, color discrimination, and dressing skills)

differed for 6 to 8 year old severely handicapped children in individual and group (4 students) instruction formats. Individual instruction led to more effective acquisition only for dressing skills, leading the authors to conclude that task requirements may influence the determination of the most effective group size. In a related study, Westling, Ferrell, and Swenson (1982) compared the effectiveness of one-to-one and small group (3 students) instruction for teaching 3 to 9 year old profoundly mentally retarded children. The one-to-one instructional arrangement was determined to be superior because instruction occurred for a longer duration and fewer teacher turn aways from the individual student occurred. The authors qualify their results, however, noting the need to vary group size according to student characteristics and task demands.

Only four studies were found that focused on mildly and moderately handicapped students; two studies involved preschoolers and the other two involved elementary students. Fink and Sandall (1978) compared the effectiveness of one-to-one and small group (n = 12) reading and arithmetic instruction for four handicapped and eight nonhandicapped preschoolers. They found that small group instruction was superior to individual tutorials for both handicapped and nonhandicapped children. In a subsequent study with developmentally delayed preschoolers, Fink and Sandall (1980) employed an intrasubject replication design (ABAB) to assess the effects of one-to-one and small group (n = 4) instruction in teaching the children to read sight vocabulary words. Using measures of the mean number of minutes per instructional session and the children's performance, they found that both instructional strategies produced considerable learning outcomes. However, significant savings in teacher time led the authors to encourage use of small group instruction.

Jenkins, Mayall, Peschka, and Jenkins (1974) conducted a series of four experiments comparing small groups and tutorial instruction in resource room settings with elementary age learning disabled and mentally retarded students. The students were instructed in groups ranging in sizes from 3 to 5. Individual tutoring was conducted by a trained peer tutor. Individual instruction resulted in better student performance on word recognition, spelling, multiplication, and oral reading tasks than did small group instruction. Forness and Kavale (1985) studied special classes for EMR students that varied in size from 12 to 15 to 19 pupils per classroom. Several effects were found in attention and communication, sometimes favoring the smaller class size and sometimes the larger. These studies with mildly handicapped students do not provide a common data base for comparing classes of fewer than 8 students with classes of more than 8 students.

Importance of the Problem

Clearly, none of the studies conducted to date, even those focusing on special education students, addresses the issue of what will happen when resource room class sizes for handicapped students change from fewer than 8 to more than 8 students per teacher. The possibility of this happening is great, especially when states begin lifting statutory limits because of budgetary constraints, as has happened in Minnesota. In fact, there already appears to be tremendous variability in student-teacher ratios among the 50 states (U.S. Department of Education, 1985). Yet, we do not know what effects different ratios have on student learning, instructional time, and instructional quality in the resource room, where mildly handicapped students receive the majority of their critical academic instruction. We need to examine effects using

consistent measures of achievement, instructional time and instructional quality.

Even within regular education, the need for additional research has been highlighted (see Cacna, 1982; Educational Research Service, 1978). Within special education, research on student-teacher ratios has focused on the severely handicapped population. Mildly handicapped students, who constitute approximately 80% of those receiving special education, have been the focus of a few studies, and those studies do not address the concerns being raised today (expanding resource room class size beyond the "small group"). There is an urgent need to determine which types of students might benefit the most from smaller classes. Although individuals suggest varying class size according to student characteristics (Cacna, 1982; Canen & Filby, 1979; Educational Research Service, 1978), little data are available on the effects of student-teacher ratios for different kinds of students, particularly mildly handicapped students.

Conceptually, we view class size as only one variable among a number of important variables that influence learning outcomes for students. An efficient student-teacher ratio is thought to be a product of many variables, including teacher and student characteristics, the content area, the instructional program and its goals, instructional methods and materials used, availability of materials and facilities, and economic factors. Therefore, research on the effects of student-teacher ratios must investigate several variables, not merely achievement.

Cacna (1982) contends that the class size and achievement issue is too complex to be dismissed with the simplistic generalization that:

> as class size increases, achievement decreases, even if it were a valid conclusion. With the goal of finding ways to increase achievement, researchers need to investigate many innovative ways to group students in different curriculum areas for different purposes at various stages of the student's development and, at the same time, to make maximum use of the skills and abilities of the educational staff. (p. 16)

Before Cacha's recommendation can be successfully investigated for mildly handicapped students, it is essential to gather data on how instructional quality, achievement, instructional time, and attitudes differ for these students under varying student-teacher ratios. With this thorough documentation, subsequent examination of the effects of different grouping strategies for students exhibiting different instructional needs in different curriculum areas could be effectively planned and executed. It is time to stop assuming that we know the best class size for a group of students. On the other hand, we cannot assume that class size makes no difference. The research proposed by the Student-Teacher Ratio Project was designed to provide an initial data base from which educators and legislators can make decisions about student-teacher ratios for mildly handicapped students.

Research Objectives

Six research objectives were addressed by the Student-Teacher Ratios Project. The objectives were:

Objective 1: To document current practices in student-teacher ratios for providing special education services to mildly handicapped elementary students.

Objective 2: To collect data and document pupil achievement of mildly handicapped elementary students in special education classes with varying student-teacher ratios.

Objective 3: To observe and document instructional time for mildly handicapped elementary students in special education classes with varying student-teacher ratios.

Objective 4: To identify potentially relevant student characteristics and begin to examine their relationships to the effectiveness of various student-teacher ratios for individual students.

Objective 5: To collect social validity data on various student-teacher ratios from students, parents, teachers, and school administrators.

These objectives were addressed in four studies.

Personnel

The Student-Teacher Ratio Project was directed by Dr. James Ysseldyke, the principal investigator. Martha Thurlow served as Project Coordinator.

Dr. Ysseldyke has a strong background in the administration of research projects. He has been Director of the Institute for Research on Learning Disabilities (1977-1983) and Director of the National School Psychology Inservice Training Network (1978-1984). He is a Professor of Educational Psychology at the University of Minnesota.

Ysseldyke has directed seven years of research on academic engaged time. He conducted an extensive observational investigation on how students spend their time in school in the early 1980s. He currently is Principal Investigator of a five-year research project on the qualitative nature of instruction for handicapped students. Ysseldyke has served in many leadership roles. In addition to having directed several major research and training projects he has served as chair of the APA Division 16 Research Committee, on the editorial boards of more than 20 journals relevant to special education, measurement, and psychology, and as Editor of School Psychology International. Ysseldyke is currently Editor of Exceptional Children, the official journal of the Council for Exceptional Children.

Dr. Ysseldyke is co-author of three textbooks, Assessment in Special and Remedial Education, Critical Issues in Special and Remedial Education, and Introduction to Special Education. He has given more than 15 major keynote and invited addresses and has presented papers at 20 national professional conferences. He has published 8 books, 16 book chapters, 38 research reports and monographs, and more than 130 journal articles.

In 1973 Ysseldyke was recognized by the School Psychology Division of the American Psycnological Association. He was that organization's first recipient of the Ligntner Witmer Award, an award given to that young school psychologist who has made the most outstanding scholarly contributions to school psychology. Ysseldyke received the award for his research on efforts to link assessment information to interventions for handicapped students.

Ms. Thurlow has a strong background in conducting research, overseeing research activities, and translating activities and findings into written reports. After receiving her degree in Educational Psychology from the Special Education Program at the University of Minnesota, Thurlow was a Research Fellow for seven years in the Research, Development and Demonstration Center in Education of Handicapped Children at the University of Minnesota. Since 1977, she has served as Associate Scientist and Editor at the Institute for Research on Learning Disabilities, and as Project Coordinator or Principal Investigator on research and demonstration projects related to early childhood and special education assessment, the quantitative and qualitative nature of instruction for special education students in elementary schools, procedures for successful integration of students with moderate to severe mental retardation into regular school programs, outcome analyses for students leaving school after having been in special education programs, and social networks and interactions of students with mild to severe disabilities. She is author of over 20 book chapters and journal articles and over 40 technical reports, and has served as a consultant to community-based educational programs.

Thurlow worked with Ysseldyke on the extensive observational investigation on now students spend their time in school. She also contributed to current research on the qualitative nature of instruction for handicapped students.

Management of day-to-day project activities was the responsibility of Thurlow. All of the various support personnel, providing data collection, data analysis and clerical support were hired under equal opportunity guidelines.

The project activities support a variety of student personnel as Research Assistants, Graduate School Fellows, or Psychometric Assistants. All student personnel associated with the project, their positions, and their dates of employment are shown in the following table.

NAME	POSITION	DATES OF EMPLOYMENT
Bakewell, Deborah	Graduate Research Assistant	06/16/88 - 07/31/88
Chang, Yu Wen	Graduate Research Assistant	03/16/88 - 06/15/87
Christenson, Sandy	Graduate Research Assistant	06/01/86 - 06/15/87
Haugen, Julie	Graduate Research Assistant	06/16/88 - 08/31/88
McVicar, Rosemary	Graduate Research Assistant	09/16/86 - 06/15/87
Nania, Paula	Graduate Research Assistant	06/01/86 - 07/31/87
Propsam, Craig	Graduate Research Assistant	06/01/87 - 08/31/88
Shriner, James	Graduate Research Assistant	07/16/87 - 08/31/88
Skiba, Russell	Graduate Research Assistant	06/01/86 - 06/15/87
Weiss, Jill	Graduate Research Assistant	06/01/86 - 10/31/86
Weiss, Jill	Graduate Research Assistant	06/16/88 - 08/15/88
Wotruba, Joseph	Graduate Research Assistant	06/16/86 - 08/31/88
Yeh, Ching-Yun	Graduate Research Assistant	09/16/88 - 08/31/88

Summary of Project Activities

Student-Teacher Ratio Project activities were completed in four areas: (a) current trends in special education student-teacher ratios, (b) examination of achievement and instruction (quantity and quality) for mildly handicapped elementary students under different student-teacher ratios, (c) factors related to effective student-teacher ratios, and (d) social validity of different student-teacher ratios. These studies, including background information, procedures, findings, and conclusions, are presented here.

Study 1

Current Trends in Special Education Student-Teacher Ratios Within the United States

The Seventh Annual Report to Congress on the Implementation of the Education of the Handicapped Act (U.S. Department of Education, 1985) contains information on personnel currently serving handicapped children in each of the states. The ratio of number of handicapped children served to special education teachers employed by handicapping condition is reported for each state for the school year 1982-83. Across all conditions, the student-staff ratio is reported to range from 8:1 in the District of Columbia to 28:1 in Washington, with the overall ratio being 18:1. For learning disabled pupils, the ratios ranged from 6:1 (DC) to 53:1 (Oregon), with the overall ratio being 21:1. For mentally retarded pupils, the ratios ranged from 7:1 (Connecticut and DC) to 25:1 (California), with the overall ratio being 13:1.

There are several problems in attempting to get a good picture of current practice in student-teacher ratios from these data. As the Report to Congress

acknowledges, the numbers must be viewed with caution. They reflect "differences across states and across years in how full-time equivalents (FTEs) are counted and reported for various categories of personnel" (p. 52). Furthermore, "noncategorical" teachers are counted evenly across the handicapping conditions, a procedure that probably results in fewer LD personnel showing than is actually the case, and in more MR personnel showing than is actually the case. Even more critical for those interested in looking at current trends for mildly handicapped elementary students is the fact that all special education students are lumped together, except in terms of handicapping condition. Thus, teachers and students are lumped across grades, even though it is likely that student-teacher ratios for elementary and secondary school levels probably vary to a considerable extent. Similarly, teachers and students are combined across severity levels within categories, despite indications that these ratios also vary.

Two research activities were completed as a part of Study 1: (a) an analysis of state guidelines for student-teacher ratios for mildly handicapped children, and (b) a survey of student-teacher ratios actually used by teachers nationally with mildly handicapped students.

Study 1A

State Guidelines for Student-Teacher Ratios for Mildly Handicapped Children

Background

The purpose of this study was to document current state guidelines for student-teacher ratios in special education, and to compare the numbers

specified in these guidelines to the pupil-teacher ratios reported by the U.S. Department of Education. This undertaking was more difficult than apparent on the surface because of the definitional problems that surround terms such as "caseload," "student-teacher ratio," and "class size." This problem has been cited as one probable explanation for inconclusive results from studies of the effects of varying class sizes (cf. Albritton, 1984; Cacha, 1982; Cahen & Filby, 1979; South Carolina State Department of Education, 1980). For example, class size has been defined or operationalized in different ways in different studies (e.g., student-teacher ratios, student-staff ratios, class averages, teacher contact hours, teacher load). In addition, authors of reports sometimes use the term "student-teacher ratio" when they actually are referring to a "caseload," and vice versa.

In the current study, "student-teacher ratio" is defined as the number of students to the number of teachers in the classroom. "Caseload" is defined as the total number of students for whom a particular teacher is responsible; some of these students are served directly while others are served on a consultative basis. "Caseload" is a term used more often by special education personnel than by regular education personnel.

Procedure

In Spring 1986, each of the 50 state offices of Special Education was contacted by telephone. A copy of the state's guidelines for student-teacher ratios for students with mild handicaps was requested for the purpose of review and inclusion in the present study. During this contact, "mildly handicapped students" were defined as "students who receive educational services partially in regular education and partially in special education."

Forty-three state departments of education (86%) indicated that they had some form of written guidelines for either caseload, student-teacher ratio, or both. Of these states, two reported that establishing caseload and student-teacher ratios was a responsibility delegated to the local school districts in the state. These two states were not included in this study. Information from two other states was never received. Thus, 39 guidelines were reviewed and categorized in this study according to the method by which caseload or student-teacher ratio was established for mildly handicapped students. Categories and definitions were developed by two staff members working together.

In addition, whenever possible, state guidelines on caseloads and student-teacher ratios were compared to the estimated pupil-teacher ratios reported in the Seventh Annual Report to Congress (U.S. Department of Education, 1985). Comparisons were performed for four categorical handicapping conditions: learning disabled (LD), mentally retarded (MR), emotionally disturbed (ED), and speech impaired (SP).

Findings

Tremendous variability was found in the state departments of education for how guidelines were developed. There appeared to be no consistency in the use of terms such as "caseload," "student-teacher ratio," and "pupil-student ratio."

In some cases, a summary of student-teacher ratios and caseloads was provided on one page. In another case, guidelines on caseloads and/or student-teacher ratios were presented throughout a 500-page document. Often, it was extremely difficult to find the recommendations related to student-teacher ratios or caseloads within the written documents.

It is virtually impossible to characterize state guidelines related to caseload or student-teacher ratios in a systematic manner because of the extreme variability in how the information is organized and then presented. One state department may specify only caseloads for students served in different kinds of settings (e.g., resource room, special classroom), while another may specify both caseloads and student-teacher ratios for students at the elementary versus secondary level, and as a function of their categorical designation, as well as their placement setting. There is considerable variance in the range of methods used to obtain caseload and student-teacher ratios for special education students.

The state recommendations for special education caseload and/or student-teacher ratios are proposed in a variety of ways. These can be categorized into at least five methods (single-criterion, two criteria, three criteria, formula, and others). Within these there are several variations. For example, single-criterion methods included those that were categorical, those based on level of service, and those based on grade level. Two-criteria methods reflected combinations of these (categorical and grade level; categorical and level of service; grade level and age range), as did three criteria methods (categorical, level of service, and grade level; categorical, level of service, and age range). Formulas using weighted mathematical procedures were found for both caseload and student-teacher ratio. Other methods generally involved a reliance on subjective methods.

A comparison of state guidelines and federally reported pupil-teacher ratios indicated that for many states, the state guideline numbers do not encompass the pupil-teacher ratio reported in the federal report. This occurred

in 7 out of 16 states (43.8%) where comparisons could be made for the LD category, in 4 out of 17 states (23.5%) where comparisons could be made for the MR category, in 8 out of 18 states (44.4%) where comparisons could be made for the ED category, and in 12 out of 20 states (60.0%) wnere comparisons could be made for tne speech impaired category. Over all categories, 11 of the 16 comparisons (68.8%) showed that the federally reported numbers did not fall witnin the state guidelines.

Conclusions

A review of data on pupil-teacher ratios reported by the federal government led to the observation that there is in fact great diversity in how states are recommending that services be provided to handicapped students. Federal personnel document this in terms of the ratio of the number of handicapped children served to the number of special education teachers. A review of data in the federal report suggests that there also may be trends in the way children are served as a function of their specific handicapping condition. For example, the overall ratios shown for students with the MR label are lower than those witn the LD label. Is this trend verified by state guidelines? No. In general, tnose states that make recommendations by category have either the same ratios for LD and MR students, or higher ones for MR students. The probable under-estimation of pupil-teacher ratios for MR students and the over-estimation of pupil-teacher ratios for LD students are recognized in the federal report; the discrepancies are attributed to the procedure of "spreading" noncategorical teachers across categories.

Pupil-teacher ratios are not broken down as a function of grade level in the federal report. Presumably, differences in ratios might be expected for

elementary and secondary level students. In those states that gave guidelines broken down by level, most presented ratios that were lower than the Federal report ratios and/or varied significantly from what was reported.

Clearly, tnere is a need to document what is happening in special education classrooms across the nation, in terms of how many students are being served by a teacher and how many students are served at any one time. It is critical to do so before we begin to examine the potential effects of different student-teacher ratios on the achievement of handicapped students. And, it is critical tnat we do so as part of the process of writing state and federal policy on the delivery of special education services.

Study 1B

Student-Teacher Ratios for Mildly Handicapped Students

Background

Increasing numbers of students are being identified as mildly handicapped each year, often at the same time that school districts are facing budget cuts. One administrative reaction to this situation has been to increase student-teacher ratios, a practice of growing concern to special educators. As part of a study to examine the effects of different student-teacher ratios on the responses of handicapped students to instruction, a national survey was conducted to examine current student-teacher ratios for mildly handicapped students. "Student-teacher ratio" is defined as the number of students and the number of teachers in the classroom at one time. This is different from "caseload," which refers to the number of students for whom a teacher is responsible.

Procedure

A survey sent to 438 special education teachers across the U.S. was completed by 238 teachers. Those identified as being either an elementary or secondary level special education teacher (n = 220) were included in analyses.

Findings

Much diversity was found in reported student-teacher ratios, overall and as a function of students' categorical labels. Respondents serving students categorized as learning disabled reported an average ratio of about 5:1 (range = 1:1-15:1). The ratio reported most often was 4:1. Respondents who served students categorized as emotional/behavior disordered reported an average ratio of about 4:1 (range = 1:1-15:1); 4:1 was reported most often. Respondents serving students with a categorical label of mental retardation reported an average ratio of 5:1 (range = 1:1-14:1); 6:1 was reported most often. Respondents serving students labeled as speech impaired reported an average ratio of 4:1 (range = 1:1-10:1); 1:1 was reported most often.

Student-teacher ratios were fairly similar for elementary and secondary teachers. Elementary level special education teachers (n = 141) reported an average ratio of 5:1 (range = 1:1-15:1). The most frequently reported ratio was 3:1. Secondary level special education teachers (n = 78) reported an average ratio of 5:1 (range = 2:1-12:1). The most frequently reported ratio was 4:1.

Special education teachers also were asked about how they typically decide on instructional groupings for students with mild handicaps. The most frequently reported bases for both elementary and secondary teachers was level of academic performance. For elementary teachers, the other bases were informal skills assessments (teacher checklists), standardized psychological testing,

student learning styles matched to teaching methods, and teachers' convenience. For secondary level teachers, otner bases were standardized psychological testing, student learning styles, type of classwork assignments, and social-emotional competencies of the student.

When the bases for selecting students for instructional groupings were examined as a function of the categorical designation of students served by the teacher, students' level of academic performance always was listed most frequently. The selection basis listed next most frequently varied with the category. For learning disabled students, it was students' learning styles matched to teaching method. For students with the label mental retardation, it was social-emotional competencies. For students categorically labeled as emotional/behavior disorders, the next most frequently mentioned basis was students' learning styles matched to teaching methods. For students requiring speech services, it was social-emotional competencies.

Conclusions

The national responses to questions about student-teacher ratios in special education highlight the need for further research on the effects of different student-teacher ratios for these students. Clearly, there is much variability in current practice. One teacher may serve an average of one student while another may serve an average of 14 students. In general, the average student-teacner ratios for different categories of students are quite similar (4:1), except for students labeled learning disabled and mentally retarded, for whom there are more students per teacher (5:1). One might question whether it is appropriate for higher student-teacher ratios to exist for these groups of mildly handicapped students. The results of the study also indicate that the

student's level of academic performance is the primary basis on which the teacher decides about the placement of a student in an instructional group, regardless of the student's category of handicap.

Study 2

Examination of Achievement and Instruction (Quantity and Quality) for Mildly Handicapped Elementary Students Under Different Student-Teacher Ratios

Background

The need to examine the effects of varying student-teacher ratios on educational outcomes for mildly handicapped students is great. Although there is a significant body of literature on student-teacher ratios (i.e., class size) in regular education, there is little information related to special education. Currently, many school districts nationwide are encountering significant financial difficulties and are looking for ways to alleviate the financial burden. A logical possibility is to reduce the numbers of teachers who are serving students, especially within special education where student-teacher ratios typically have been low. A first step in this direction has been taken in Minnesota, where there no longer is a statutory limit on the student-teacher ratio for level 3 (mildly) handicapped students. During the next few years, Minnesota may expect to see special education teachers working with mildly handicapped students in increasingly larger groups. It is critical to examine what the effects of different class sizes are on the education of these students.

It is important to look at more than just changes in achievement. Recent research literature suggests that many variables are as important as

achievement, if not more important. Included among these other factors are both quantity and quality of time. Quantity of time refers to a measurement of time in days, nours, minutes, or seconds. While research has shown that scheduled time and allocated time for instruction are important, a key variable is "academic engaged time," which has variously been called "academic learning time," "opportunity to learn," "academic responding time," and "time on task." Tnis type of time refers to the amount of time that students spend actually engaged in learning or academic responding, such as reading silently, reading aloud, answering questions, asking questions, writing, etc. The amount of time during which students are moving from one area of the room to another, or looking out the window, or sharpening their pencils, or waiting for the teacher to work with them, is not considered to be academic engaged time.

Another important trend has been a focus on qualitative aspects of instruction. As Good (1983) notes, "the value of future classroom research will improve if more attention is placed upon the quality of instruction" (p. 129). While many efforts are being made in this direction, the focus again is on regular education instruction. Little attention has been given to what constitutes quality instruction for the special education student. A scale for rating the instructional environment, the "Instructional Environment Scale" (IES), was used in this study to look at factors such as task relevance, motivational techniques, and student understanding. Ratings were based on observations and interviews with the teacher and student.

Procedure

Subjects were 139 students (91 males, 48 females) in grades 1-6 receiving special education services. The students who were labeled as learning disabled

(LD; n = 114), emotionally/behaviorally disturbed (EBD; n = 19), or educable mentally retarded (EMR; n = 6) were from 27 schools in 8 school districts in a metropolitan area.

Students were observed by trained observers during each student's special education time. Observers used specially designed instruments (CISSAR, IES, TIES) to record observations on quality of instruction, the ecological environment of the instructional setting, and quantity of time spent and behavior of student academically engaged or responding to specific instructional tasks. Observation time of students ranged from 30 to 60 minutes. This study examined students in five student-teacher ratios: 1:1, 3:1, 6:1, 9:1, and 12:1.

Findings

In examining percentage of time allocated to selected activities, tasks and classroom structures some significance between the five STR groups were found when the student was engaged with the teacher in discussion showing that a greater proportion of time was spent in a 12:1 STR than 3:1 STR for student-teacher discussion. Entire group structured activities in the classroom were used more frequently in 3:1, 6:1, 9:1, and 12:1 STRs, whereas more individual time was spent in smaller STRs of 3:1 and 6:1. Teacher tasks also were of a hign proportion in 12:1 STR than lower STRs of 3:1.

Student responses such as writing, reading aloud, talking appropriately, answering questions, asking questions, attending, and look around were found to vary with the student-teacher ratio and were all found to be significant. For writing, the trend was toward larger percentages of time writing in STRs of 1:1 (20%), 3:1 (15%), and 6:1 (12%) compared to STRs of 9:1 (8%), and 12:1 (7%). Percentage of time reading aloud was found to be significantly different for the

1:1 ratio (14%) compared to both the 6:1 (6%) and the 12:1 (2%) ratios. Proportion of time in appropriate talk was found to be significantly greater in the 1:1 (11%) and 3:1 (8%) compared to only the 6:1 STR group (4%). Significant differences between pairs of ratios were not identified for the percentage of time students spent asking questions. A significantly lower percentage of time in attending was found for the 3:1 ratio (19%) than for STRs of 6:2 (38%), 9:1 (45%), and 12:1 (53%). Furthermore, a significant difference was found between STRs of 1:1 (28%) and 12:1 (53%) for percentage of time attending. The greater percentages of student response time in looking around were found in STRs of 6:1 (4%) and 12:1 (7%) compared to the STR of 1:1 (1%).

For the academic repsonding time (ART) composite, results indicated that the percentage of ART in STRs of 1:1 (66%) and 3:1 (55%) were significantly greater than the ART percentages in higher STRs (27% - 44%). For the academic engaged time (AET) composite, the greater percentage of time in the 1:1 ratio (95%) was found to be significantly different from AET percentages in the other four STR groups (80 - 84%). The follow-up test for the task management composite indicated that a significantly smaller percentage of time was spent in task management responses in the STR of 1:1 compared to 3:1, 6:1, and 9:1 (2% vs 8% - 14%). Finally, the follow-up test for the inappropriate behavior composite indicated a signifiicant difference in percentage of time between STRs of 1:1 (3%) and 12:1 (12%).

No significant differences were found for task completion and task success across for all five STRs, even though student performance ranged from 89% to 100% for task completion and from 83% to 94% for task success.

Results of observations of the qualitative nature of instruction using IES indicated a significant difference for varying STRs in the categories of Checking for Student Understanding, Task Relevance, and Feedback. Observations of the qualitative nature of instruction using TIES found adaptive instruction to be significantly different for different STRs, with the trend across all observational categories being toward higher ratings for STRs of 1:1 and 3:1 compared to 6:1, 9:1, and 12:1.

Conclusions

These results display trends in how the qualitative nature of instruction, student academic response, and student task completion and success may be affected by different student-teacher ratios. Clearly these results suggest that differences do occur in the instruction of mildly handicapped students. The findings suggest a focus for further investigation for such questions as: If STRs have an impact on student academic response and academic engaged time, then what is the optimal STR for student academic gain?

Study 3

A Case Study Analysis of Factors Related to Effective Student-Teacher Ratios

Background

Given the finding from independent group comparisons that students have higher rates of academic responding when they are taught within classes that have lower student-teacher ratios (STRs), a reasonable question is whether these differences continue to be found for a single student who changes from one student-teacher ratio to another. The wide variability found in the group data for any single student-teacher ratio indicates that it is doubtful that we will

find a simple relationship between student-teacher ratio and student achievement, academic engaged time, or instructional environment quality. More likely we will find that for one student a given class size was conducive to maximal academic progress, engaged time, and instructional quality, while for another student in the same class size, there was only minimal academic progress, engaged time, and instructional quality. Learning reflects a complex interaction of child characteristics, teacher characteristics, the nature of an intervention, the setting in which an intervention is implemented, and the target behavior. Perhaps specific student characteristics (or, student-teacher interaction characteristics), regardless of the special education category (LD, EBD, EMR) are related to student performance in smaller class sizes.

The purpose of this study was to identify relevant student characteristics and begin to examine their relationship to the effectiveness of various student-teacher ratios for individual students.

Procedure

A case study analysis was conducted on nine students who were observed in special education under different student-teacher ratios, with the goal being to identify factors related to gains in achievement and to higher active academic responding times in relation to different student-teacher ratios. The nine students included four girls and five boys from seven schools in two school districts. Information was collected on each student in the areas of aptitude, achievement gains during a one-year period, behavior, the nature of home, school, and community learning environments, methods of instruction, and the student's academic engaged time (and other times) under different student-teacher ratios. Procedures included observations and interviews with students,

parents, teachers, and principals, as well as other methods (see Ysseldyke, Bakewell, Christenson, Muyskens, Shriner, Cleary, & Weiss, 1988 for complete information on measures).

Data collection activites were conducted by a number of observers and research assistants during a six month period for all but achievement testing. Achievement tests were administered both at the end of the preceding academic year and at the end of the academic year in which observational data were collected.

The case study analysis was conducted at a descriptive level. Information about each student was examined and then summarized in terms of characteristics of the student, the special education setting, achievement levels and changes, and any potential relationships among student-teacher ratios and outcomes.

Findings

The nine cases included in the case study analysis reflected the complex nature of students' active responding times as a function of differing student-teacher ratios in interaction with various characteristics of the student, the home environment, and the community environment. No consistent patterns were identified that would suggest one student-teacher ratio is superior to another for students with certain characteristics. For example, in three cases, the student's active responding rates increased with increased student-teacher ratios (contrary to typical expectations). In five cases, active responding rates decreased with increased student-teacher ratios. The special education categorical label assigned to the student was not related to the effectiveness of different student-teacher ratios. Further, academic responding rates were not automatically high in the special education setting.

Conclusions

While generalizations can be made about the effects of different special education student-teacher ratios these generalizations do not necessarily hold in individual cases.

Study 4

Social Validity of Different Student-Teacher Ratios

Background

Studies 1-3 of the Student-Teacher Ratio Project examined practice related to student-teacher ratios and the effects of practice on student responses to instruction. Findings from these investigations, for the most part, did not address issues such as student comfort, effects on peer interactions, and teacher ease in preparing instruction. These kinds of issues relate to social validity. "Social validity" refers to the consumer's reaction to a change or intervention, and thus deals with attitudes or affective outcomes (Wolf, 1978). Social validity clearly needs to be examined when studying the effectiveness of different student-teacher ratios for students with handicaps in special education settings. The purpose of this study was to examine opinions about optimal student-teacher ratios for both student learning and teacher instruction. Information was obtained from administrators, special education teacners, and parents of students served in special education.

Procedure

Survey forms were sent in late Spring, 1988, to all parents and special education teacners of students who had been observed in the special education setting some time within the past two years. Relevant school district

administrators (e.g., superintendents, directors of special education, curriculum directors, principals) from the 8 school districts from which students had been selected were targeted as well as teachers. All surveys were sent with an addressed stamped return envelope. Opinions about optimal group sizes for student learning and teacher instruction, the largest reasonable group size, trade off issues, and parental satisfaction with current group sizes were examined.

Findings

For items related to student learning, about two-thirds of the responding administrators preferred group sizes of either 2-3 (median = 44.0%) or 4-6 (median = 24.0%). Still, 34.0% of the administrators indicated that in special education students enjoy learning more when taught in a group size of 7-9 or above. None of them selected a group size of 1 as the best choice for this item. On the other hand, for each of the five student learning questions, the 2-3 group size was selected by the largest percentage of teachers (ranging from 43.3% to 72.4%; median = 51.6%). The largest percentage (72.4%) gave the 2-3 group size in response to the items about the group size in which students enjoy learning more. Very few teachers selected the group size of 7-9 as the best choice for any of the five questions. Only one respondent, on one item (students acquire more skills), selected the group size of greater than 9 as the best choice. About two-thirds of the parents preferred group sizes of 1 or 2-3 for every item in the student learning cluster. Few parents chose the group sizes of 7-9 or more than 9, with the exception of the item on the group size in which children would most enjoy learning, where 20.0% chose the larger group sizes.

On items related to teacher instruction, 80% of the administrators chose eitner group size of 2-3 or 4-6. More than 80% of teachers preferred either group size 1 or 2-3 across the two items. Nearly 30% indicated that quality instruction in special education can be better provided for students in a group size of 1. Very few teacners preferred larger group sizes; the percentages cnoosing group sizes of 7-9 or more than 9 never exceeded 7%. For the one teacner item instruction on the parent form, the 2-3 group size received the highest frequency. Very few parents preferred larger group sizes (less than 7% selecting 7-9 or more than 9).

When asked about the largest group size within which instruction is reasonable, the group size that received the highest frequency of responses in all groups was 4-6, selected by 44.0% of administrators, 56.7% of teachers, and 48.8% of parents. The group size with the second highest frequency count was 2-3 for teachers, (26.7%) and 7-9 for both administrators (32.0%) and parents (30.2%). Still, 12.0% of administrators and 11.6% of parents chose a group size of more than 9 as the largest group size reasonable for instructing students.

When asked to make a choice between students receiving in special education eitner (a) more frequent instruction in large group sizes, or (b) less frequent instruction in small group sizes, differences from expected frequencies were found only for parents. Preference for less frequent instruction in smaller group sizes was indicated by 67.5% of parents and by 63.3% of teachers. In contrast, preference for more frequent instruction in large group sizes was indicated by 63.6% of administrators.

Most parents indicated group sizes of 2-3 (43.1%) and 4-6 (25.9%) when asked to indicate the group size in which their child received special

education. Overall, regardless of group size, parents were satisfied (46.6%) or very satisfied (43.1%) with their child's current group size. Only 6.4% were dissatisfied and only 3.4% were very dissatisfied with the size.

Conclusions

There seems to be a tendency for parents and teachers to prefer smaller group sizes while administrators prefer somewhat larger group sizes. Yet, parents (not teachers) switch to higher group sizes when noting the group size in which students enjoy learning more. Another interesting finding is that few parents are unhappy with the group size within which their child receives special education services.

Integration of Findings

The findings from the Student-Teacher Ratio Project, when integrated, produce a picture of current practice and some of the effects related to different student-teacher ratios in providing special education services to students with mild handicaps. The presence of considerable variability in practice and its potential implications for students having difficulties in schools is one major conclusion that comes out of the findings. This variability is reflected in federally-reported state STRs that do not accurately represent state guidelines, and in state guidelines for STR and caseload that frequently do not reflect actual practices of special education teachers in the state. While some may argue that this variability is functional in that it represents the variability of interventions that should be used with a variety of student and teacher characteristics, the findings of the current studies indicate that varying STRs are more a function of teacher or school district

preference, rather than a response to the optimal rate of student success or achievement. Most frequently, STRs in special education services for students with mildly handicapping conditions are a function of fiscal budgetary considerations set against pressures from parental and other groups for more individualized services.

The results of the studies also suggest that while it is possible to draw conclusions based on group differences (i.e., observed students had higher rates of active academic responding and academic engagement in smaller student-teacher ratios than in higher student-teacher ratios), this generalization cannot be made about individual students. A complex interaction of factors impinges on student rates of active academic responding and engagement; no single factor, such as student-teacher ratio, can explain student responses, much less achievement. Further, it is not necessarily the case that higher active academic responding and engagement rates are the sole objectives of education, even special education. Considerations about students' self esteem, enjoyment of learning, and development of normal peer relationships, to name a few, must also be weighed. And, when these other objectives are considered, the smaller student-teacher ratio may be less desirable than a somewhat larger student-teacher ratio.

Clearly, we can benefit from additional research on the quality and impact of instruction for students with mildly handicapping conditions in varying student-teacher ratios. National standards for student-teacher ratios and caseloads, or perhaps at least standards for the presentation of state guidelines on student-teacher ratios, could not help but be beneficial also.

Project Products

The Student-Teacher Ratio Project has proceeded under the belief that researchers have an obligation to document their activities and findings and to make this information available to the public. The major vehicles for dissemination used by the Student-Teacher Ratios Project have included: (a) annotated publication lists, (b) research reports, (c) ERIC citations, (d) summary reports, and (3) journal articles.

Annotated Publication Lists

The Instructional Alternatives Project continuously updates an annotated list of all publications. This list, which provides the basic findings or conclusion of each publication, has been sent to all persons requesting information and has been distributed at all major conferences at which presentations were made by project staff. The Student-Teacher Ratio Project's publications are included with other publications on the annotated publications list of the Instructional Alternatives Project. A copy of the annotated publication list is provided in Appendix A.

Research Reports

Research reports present the rationale, procedures, results, and implications of research activites. During its two years of funding, the Student-Teacher Ratio Project produced five reports:

No. 6 State Guidelines for Student-Teacher Ratios for Mildly Handicapped Children by M. L. Thurlow, J. E. Ysseldyke, & J. W. Wotruba (July, 1987)

No. 7 Student-Teacher Ratios for Mildly Handicapped Children in Special Education Settings by J. E. Ysseldyke, M. L. Thurlow, & J. W. Wotruba (November, 1987).

No. 12 Examination of Achievement and Instruction (Quantity and Quality) for Mildly Handicapped Elementary Students under Different Student-Teacher Ratios by M. L. Thurlow, J. E. Ysseldyke, & J. W. Wotruba (August, 1988).

No. 14 A Case Study Analysis of Factors Related to Effective Student-Teacher Ratios by J. E. Ysseldyke, M. L. Thurlow, J. G. Shriner, C. Propsom (August, 1988)

No. 16. Social Validity of Different Student-Teacher Ratios by M. L. Thurlow, J. E. Ysseldyke, & C. Yeh (August, 1988).

ERIC Citations

Upon publication, research reports from the Student-Teacher Ratio Project were sent to the Educational Resources Information Center (ERIC). In this way, each report is announced in the monthly abstract journal of the ERIC system (Resources in Education). In addition, it is made available in both microfiche and paper form through the ERIC Document Reproduction Service (EDRS).

The process of assigning an ERIC number to each publication and preparing it for availability through EDRS takes about 15 months. When the numbers are available, they are added to the annotated publication list to further ensure the accessibility of products from the Student-Teacher Ratio Project.

Summary Reports

One page summary reports of individual studies were prepared to provide specific feedback to research participants and others interested in particular studies. These were written to be relatively nontechnical, so that they could be read easily by the lay person. While originally developed for research participants, the study summaries have provided an important avenue for dissemination of research findings to larger audiences.

Journal Articles

Findings from the Student-Teacher Ratio Project were submitted to journals in the form of articles. Some of these manuscripts have been accepted and others have been submitted for publication. These are listed here.

Thurlow, M. L., Ysseldyke, J. E., & Wotruba, J. W. (in press). State recommended student-teacher ratios for mildly handicapped children. Remedial and Special Education.

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IAP PUBLICATIONS

Instructional Alternatives Project
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Research Reports

No. 1 Time allocated to instruction of mentally retarded, learning disabled emotionally disturbed, and nonhandicapped elementary students by J. E. Ysseldyke M. L. Thurlow, S. L. Christenson, & J. Weiss (March, 1987).

No. 2 Instructional tasks used by mentally retarded, learning disabled, emotionally disturbed, and nonhandicapped elementary students by J. E. Ysseldyke, S. L. Christenson, M. L. Thurlow, & D. Bakewell (June, 1987).

No. 3 Instructional grouping arrangements used with mentally retarded, learning disabled, emotionally disturbed, and nonhandicapped elementary students by J. E. Ysseldyke, M. L. Thurlow, S. L. Christenson, & R. McVicar (July, 1987).

No. 4 Academic engagement and active responding of mentally retarded, learning disabled, emotionally disturbed and nonhandicapped elementary students by J. E. Ysseldyke, S. L. Christenson, M. L. Thurlow, & R. Skiba (July, 1987).

No. 5 The qualitative nature of instruction for mentally retarded, learning disabled and emotionally disturbed elementary students in special education by J. E. Ysseldyke, S. L. Christenson, & M. L. Thurlow (July, 1987).

No. 6 State guidelines for student-teacher ratios for mildly handicapped children M. L. Thurlow, J. E. Ysseldyke, & J. W. Wotruba (July, 1987).

No. 7 Student-teacher ratios for mildly handicapped children in special education settings by J. E. Ysseldyke, M. L. Thurlow, & J. W. Wotruba (November, 1987).

No. 8 Regular education teachers' perceptions of instructional arrangements for students with mild handicaps by J. E. Ysseldyke, M. L. Thurlow, J. W. Wotruba, P. A. Nania (January, 1988).

No. 9 Differences in the qualitative nature of instruction for LD and EBD students in regular and special education settings by J. E. Ysseldyke, S. L. Christenson, M. L. Thurlow (January, 1988).

No. 10 Alternate explanations for learning disabled, emotionally disturbed, and educable mentally retarded students' reading achievement by J. E. Ysseldyke, D. Bakewell, S. L. Christenson, P. Muyskens, J. G. Shriner, M. Cleary, & J. Weiss (July 1988).

No. 11 Alternate explanations for learning disabled, emotionally disturbed, and educable mentally retarded students' math achievement by J. E. Ysseldyke, M. Cleary, S. Christenson, P. Muyskens, J. G. Shriner, D. Bakewell, & J. Weiss (August, 1988).

No. 12 Student and instructional outcomes under varying student-teacher ratios in special education by M. L. Thurlow, J. E. Ysseldyke, & J. W. Wotruba (August 1988).

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No. 13 Teacher stress and student achievement for mildly handicapped students by D. Bakewell, S. R. McConnell, J. E. Ysseldyke, & S. L. Christenson (August, 1988).

No. 14 A case study analysis of factors related to effective student-teacher ratios by J. E. Ysseldyke, M. L. Thurlow, J. G. Shriner, & C. S. Prompsom (August, 1988).

No. 15 Written language: The instructional experience of mildly handicapped and nonhandicapped elementary students by R. McVicar, S. L. Christenson, M. L. Thurlow, & J. E. Ysseldyke (August, 1988).

No. 16 Social validity of different student-teacher ratios by M. L. Thurlow, J. E. Ysseldyke, & C. Yeh (August 1988).

No. 17 Home environments of mildly handicapped and nonhandicapped elementary students by S. L. Christenson, J. E. Ysseldyke, & M. Cleary (September, 1988).

Monographs

No. 1 Instructional environment scale: Scale development and training procedures by J. E. Ysseldyke, S. L. Christenson, R. McVicar, D. Bakewell, & M. L. Thurlow (December, 1986).

No. 2 Instructional psychology and models of school learning: Implications for effective instruction of handicapped students by S. L. Christenson, J. E. Ysseldyke, & M. L. Thurlow (May, 1987).

No. 3 School effectiveness: Implications for effective instruction of handicapped students by M. L. Thurlow, S. L. Christenson, & J. E. Ysseldyke (May, 1987).

No. 4 Instructional effectiveness: Implications for effective instruction of handicapped students by S. L. Christenson, M. L. Thurlow, & J. E. Ysseldyke (May, 1987).

No. 5 Teacher effectiveness and teacher decision making: Implications for effective instruction of handicapped students by J. E. Ysseldyke, M. L. Thurlow, & S. L. Christenson (May, 1987).

No. 6 Student cognitions: Implications for effective instruction of handicapped students by M. L. Thurlow, J. E. Ysseldyke, & S. L. Christenson (May, 1987).

No. 7 Instructional factors that influence student achievement: An integrative review by J. E. Ysseldyke, S. L. Christenson, & M. L. Thurlow (September, 1987).

No. 8 Adults in the classroom: Effects on special education instruction by A. E. Dear, M. L. Thurlow, & J. E. Ysseldyke (September, 1987).

No. 9 Student-teacher ratios and their relationship to instruction and achievement for mildly handicapped students, Final Report by J. E. Ysseldyke (August, 1988).